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# 1.0 PURPOSE OF AND NEED FOR ACTION

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The North Carolina Department of Transportation's (NCDOT, 2001) 2002-2008 Transportation Improvement Program (TIP) includes a highway improvement project in Caldwell and Watauga counties at Blowing Rock from SR 1500 (Blackberry Road) north to US 221 in Blowing Rock. Consequently, studies are underway in accordance with the requirements set forth in the National Environmental Policy Act (NEPA) of 1969, as amended. This purpose and need statement explains why an improvement should be implemented.

## 1.1 Project Need

The primary needs of the proposed action include:

- **Traffic service deficiencies exist along US 321 within the project area and service will continue to deteriorate.**

US 321 currently operates at a peak hour level of service (LOS) F between Blackberry Road and Green Hill Road (in Blowing Rock). Since LOS F reflects traffic volumes greater than the capacity of the road, it indicates high delays and basically no passing opportunities exist during peak periods. A primary reason for this condition is the mountainous terrain of the southern half of the project, which results in slow uphill truck speeds. Within the balance of the project area in Blowing Rock, the level of service is undesirable (LOS D/E) all along US 321.

In 2025, US 321 south of Green Hill Road would continue to operate at LOS F in the peak periods, although delays would increase substantially as traffic grows. Operations on US 321 through Blowing Rock would operate at LOS E between Green Hill Road and US 321 Business. Between US 321 Business and US 221, US 321 would operate at LOS F. Traffic under these conditions would be extremely congested during peak periods.

Refer to Table 1-3 and Table 1-4 in section 1.5.6, "Level of Service," for the exact locations expected to operate at undesirable levels of service and Table 1-2 for level of service definitions.

- **Accident rates on existing US 321 within the Town of Blowing Rock are far higher than statewide averages for similar roads.**

The total accident rate for existing US 321 within Blowing Rock is 28 percent higher than for similar urban US routes in North Carolina. The non-fatal injury accident rate is 23 percent higher, and the property damage accident rate is 30 percent higher than the state comparative rates. One fatality occurred within the last three years. Narrow lanes and poor sight distances, combined with turning vehicles at intersections and driveways appear to explain the high levels of accidents on US 321 in Blowing Rock.

Refer to Table 1-5 in section 1.5.7, "Accidents/Safety," for more specific details on the types and locations of accidents.

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Furthermore, in the 1989 Highway Trust Fund Act, the North Carolina State legislature designated a network of US and North Carolina highways as intrastate corridors. The Intrastate System was established to connect major population centers and provide safe, convenient travel for motorists. The intrastate system plan calls for the widening of the system's existing two-lane roads to at least four travel lanes. US 321 from the South Carolina border south of Gastonia to its junction with US 421 west of Boone is part of the Intrastate System. This corridor is defined as the principal north-south route uniting the western Piedmont region of North Carolina. The section of US 321 in the project area is the last segment of US 321 in the intrastate system for which the approach to building four lanes remains unresolved.

## **1.2 Project Purpose**

The primary purposes of the proposed action include the following:

- **Improve traffic flow and level of service on US 321 from Blackberry Road to US 221.**

Without road improvements, the forecast traffic along this section of US 321 will exceed the road's capacity, (and already does in some places) creating undesirable levels of service. The proposed improvement would provide congestion relief.

- **Reduce accidents on US 321 within Blowing Rock.**

Without road improvements, high accident rates are expected to continue. The number of accidents will likely rise as traffic volumes continue to rise. Improvements could increase sight distances by straightening curves, thereby providing a new facility with greater capacity and better horizontal and vertical alignments. The improvements would also provide separate lanes for drivers turning left and provide drivers with an additional through lane.

Furthermore, it is a purpose of the proposed action to achieve the system continuity objectives of the Highway Trust Fund Act.

## **1.3 Background Information**

### **1.3.1 Setting and Land Use**

The project area is in western North Carolina (see Figure 1-1) and encompasses the northern part of Caldwell County and the southern part of Watauga County, including the resort community of Blowing Rock (see Figure 1-2). The project area extends well east of US 321 to encompass the locations of potential bypass alternatives. Land use in the project area includes scattered rural residential development in Caldwell County and eastern Blowing Rock, as well as concentrated low-density residential, commercial, and recreational development in Blowing Rock, both east and west of US 321. Within Blowing Rock, US 321 passes through a district that is listed in the National Register of Historic Places (NRHP). US 321 is adjacent to the Green Park Inn and the Blowing Rock Country Club, which are included in the historic district. It is adjacent to the Bollinger-Hartley House, a residential structure also listed in the National Register. Development along US 321 in the southern portion of Blowing Rock is primarily low-density residential, while the primary development along US 321 in the northern portion of Blowing Rock is highway commercial. Development in Blowing Rock off of US 321 is primarily single-family residential

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**Figure 1-1. Regional Project Map**

This Figure may be viewed by clicking the [List of Figures](#) .

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**Figure 1-2. Project Area Map**

This Figure may be viewed by clicking the [List of Figures](#) .

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with very few commercial structures. The Blue Ridge Parkway is not crossed by the existing road within the project limits, but a potential bypass alternative would pass under the Parkway in a tunnel.

### **1.3.2 Population Growth**

Traditionally, Caldwell County has grown slower than the surrounding counties and the State of North Carolina. However, Caldwell County's population grew 4.4 percent (67,746 to 70,709) from 1980 to 1990; between 1990 and 2000, the County experienced a 9.5 percent growth in population (70,709 to 77,415) the population is expected to increase to 86,577 by 2020, a 15.1 percent growth rate

Watauga County's population grew by 16.7 percent from 1980 to 1990 (31,666 to 36,952); a 15.5 percent increase in population was experienced for the period 1990 to 2000 (36,952 to 42,695). The population is expected to increase 8.8 percent over the next 20 years (42,695 to 51,567). The permanent population of the Town of Blowing Rock has not changed substantially since 1980. It was 1,423 in June 2000. The census population figures do not represent the seasonal/part-year residents. Blowing Rock's population rises to about 10,000 persons in the summer months, as estimated by Blowing Rock town planners.

### **1.3.3 Project History**

In 1993, an Environmental Assessment (EA) (NCDOT, August 1993) was prepared that recommended widening US 321 from NC 268 in Patterson to US 221 in Blowing Rock. Based on comments from the State Historic Preservation Officer and the general public, a Finding of No Significant Impact (FONSI) (NCDOT, September 1994) was prepared for the southern 10.8 miles (17.4 kilometers) of the project area, from NC 268 to SR 1500 (Blackberry Road). This section has independent utility and its selection did not preclude consideration of alternatives in the Blowing Rock area. Because of the mountainous terrain, steep grades and poor alignment, improvements from NC 268 to SR 1500 (Blackberry Road) are much needed from a safety and capacity standpoint. At public hearings, representatives of government, businesses, Appalachian State University, and the public spoke in favor of a four-lane US 321 between NC 268 and US 221. However, many citizens from Blowing Rock strongly supported a project that included a bypass around Blowing Rock. The FONSI therefore indicated that an environmental impact statement (EIS) would be prepared for the northern 4.3 miles (6.9 kilometers) of the EA's project area (from Blackberry Road to US 221 in Blowing Rock) that compared the Widening Alternative with a Blowing Rock bypass.

## **1.4 Thoroughfare Planning**

### **1.4.1 Overview of the Thoroughfare Planning Process**

The thoroughfare planning process is a comprehensive transportation planning process that integrates urban area planning practices with local, regional, and statewide transportation planning practices. The process identifies transportation planning needs by evaluating land development and population growth trends in rural counties and urbanized areas. The process begins through a cooperative effort between the NCDOT's Statewide Planning Branch and local planning officials. Socio-economic data is collected, including business and residential area inventories, existing street inventories, identification of environmental constraints, and information about the history of the area. A base year transportation model is built. Utilizing

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input from local planning officials, land development and population growth trends are projected and applied to the model. Through this modeling process and local knowledge of the area's socio-economic conditions, the thoroughfare planning team identifies transportation deficiencies and determines short- and long-term solutions for eliminating or diminishing those deficiencies.

#### **1.4.2 Caldwell and Watauga County Thoroughfare Planning**

The 1981 Thoroughfare Plan prepared by the NCDOT for Caldwell County states that the number of lanes should be increased from two to four on US 321. When identifying future road improvement needs, the 1993 Thoroughfare Plan for the Region D Council of Governments (Alleghany, Ashe, Avery, Mitchell, Watauga, Wilkes, and Yancy Counties) assumes that US 321 is widened as specified in the TIP (see below). Watauga County adopted the Watauga County component of the Region D plan.

#### **1.4.3 North Carolina Transportation Improvement Program**

The project is included as TIP Project No. R-2237C in the 2002-2008 NCDOT Transportation Improvement Program (NCDOT) covering the period from Federal Fiscal Year (FFY) 2002 (October 2001) to FFY 2008 (September 2008).

The following additional transportation improvement projects are near the project area:

- |         |   |
|---------|---|
| R-2237B | Widen US 321 to a multi-lane road from SR 1370 (Nelson Chapel Road) to SR 1500 (Blackberry Road) in Caldwell County. Right-of-way acquisition is scheduled for FFY 2002 and construction is scheduled to start in FFY 2005. |
| R-529   | Widen US 421 to a multi-lane road from NC 194 in Boone to two miles east of US 221 in Watauga County. This project is under construction.   |
| U-3800  | Widen US 321 (Harden Street), to five lanes from Rivers Street to US 421/NC 194 in Boone. This project is under construction.   |
| R-2566  | Widen NC 105 to a multi-lane road from US 221 in Avery County to SR 1107 in Boone. This project is identified as a future need only.  |
| R-2615  | Widen US 421 to a multi-lane road from US 221 in Boone to the Tennessee State Line. This project is identified as a future need only.   |
| R-2915  | Widen US 221 to four lanes divided road from US 421 in Watauga County to US 221 Bypass South of West Jefferson. Right-of-way acquisition is scheduled for FFY 2008, construction is post year.                              |

### **1.5 Transportation Network and Operating Characteristics**

#### **1.5.1 Existing Road Network**

US 321 is designated as a principal arterial in the statewide highway network and carries both local and through traffic. It is a part of North Carolina's intrastate system. It is an important transportation link uniting the western Piedmont region of North Carolina from Charlotte to the mountains. It is a two-lane road within the project area and there is no control of access. Other

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US routes in Watauga and northern Caldwell counties are US 421, which passes east to north through Watauga County and Boone, and US 221, which passes southwest to northeast through Watauga County via Blowing Rock and Boone. NC 105 and NC 194 also serve Watauga County. I-40 is the interstate highway nearest the project area, 40 miles (64.4 kilometers) southeast of Blowing Rock on US 321. (See Figure 1-1. Regional Project Map.)

### **1.5.2 Roadway Characteristics and Posted Speeds**

The roadway in the project area can be described best in three sections, each with common characteristics:

- The rural section south of Blowing Rock.
- The urban section between Green Hill Road and US 321 Business in Blowing Rock.
- The urban section between US 321 Business and US 221 in Blowing Rock.

The two-lane rural section south of Blowing Rock has a 22-foot (6.6-meter) paved travelway with a 1-foot (0.3-meter) paved shoulder on each side and a speed limit of 50 miles per hour (mph) (80 kilometers per hour (km/h)). The horizontal alignment is poor with numerous sharp curves up to 30 degrees (the design speed is approximately 25 mph (40 km/h)). In addition, the terrain is mountainous with nearly continuous grades between six and eight percent uphill into Blowing Rock.

The two-lane urban section of US 321 between the Green Hill Road area and US 321 Business (which passes through the Green Park Historic District) has a 24-foot (7.2-meter) pavement width and a travelway varying between 20 and 22 feet (6.1 and 6.7 meters). The speed limit is 35 mph (56 km/h). Grass shoulders are either non-existent or very narrow. The horizontal alignment is fair with a series of four reverse curves up to 24 degrees (the design speed is approximately 30 mph [50 km/h]).

The urban section between US 321 Business and US 221 has two lanes with a pavement width varying between 20 and 22 feet (6.1 and 6.7 meters) and a speed limit of 35 mph (56 km/h). The northernmost 0.1 mile (0.16 kilometer) of this section has four lanes. The alignment is generally straight on rolling terrain with a maximum grade of five percent.

Passing opportunities along the entire project length are limited because of the terrain and sight distance restrictions.

### **1.5.3 Sidewalks and Pedestrian Movements**

There are no sidewalks along the project, except for a single existing sidewalk in front of the Green Park Inn. Concentrations of pedestrian travel across US 321 occur at three points in Blowing Rock: the Green Park Inn, Sunset Drive, and Possum Hollow Road. In the Green Park Inn area, pedestrians cross US 321 between the Green Park Inn and a parking lot opposite the Inn.

#### 1.5.4 Intersections and Access Control

The US 221, Sunset Drive, and Possum Hollow Road/Shoppes intersections in Blowing Rock, are signalized. Traffic volumes on most intersecting roads are light. No restriction on access to abutting properties currently applies.

#### 1.5.5 Traffic Volumes

Table 1-1 and Figure 1-3 and show the 1998 Average Daily Traffic (ADT) and the 2025 forecast ADT for each major link on US 321. As indicated in Figure 1-3, the existing 1998 ADT was 7,525 vehicles south of Blowing Rock, 8,325 to 10,000 vehicles south of Sunset Drive in Blowing Rock, and 11,750 to 15,350 vehicles north of Sunset Drive. The 1998 ADT figures are interpolated volumes calculated by the NCDOT between its 1994 traffic counts and its 2025 forecasts. The original 1994 figures were actual counts taken in May as a part of preparation of a new Boone thoroughfare plan. May was chosen for the counts by the NCDOT after consultation with local officials; it represents an “average” month. The forecast traffic volumes for the design year 2025 are based on local population and employment growth trends and the NCDOT’s 1998 Blowing Rock Origin and Destination Study.

The 2025 ADT is forecast to be 14,100 vehicles south of Blowing Rock (south of Green Hill Road); 15,150 to 17,400 vehicles south of Sunset Drive in Blowing Rock; and 21,300 to 27,450 vehicles north of Sunset Drive. Traffic is expected to grow between 73 and 87 percent between 1998 and 2025.

The traffic volumes include eight percent daily truck traffic on US 321, including three percent tractor-trailers and five percent other trucks. Because non-truck traffic makes up a higher percentage of total traffic during peak hours, the peak hour truck percentages are assumed to be one-half of the daily percentages (four percent daily truck traffic, 1.5 percent tractor-trailers and 2.5 percent other trucks).

**Table 1-1. Existing (1998) and Forecast Average Daily Traffic (ADT) and Forecast Design Hour Volume**

Link Description	Link Maximum			
	1998 (ADT)	2025 (ADT)	2025 (Design Hour Volume) <sup>1</sup>	% Growth 1998 to 2025
South of Green Hill Road	7,525	14,100	1,970	87.4%
Green Hill Road-Goforth Road	8,925	15,900	2,230	78.2%
Goforth Road-US 321 Business	9,525	16,900	2,370	77.4%
US 321 Business-Sunset Drive	10,000	17,400	2,440	74.0%
Sunset Drive-Food Lion Driveway	12,300	21,300	2,980	73.2%
Food Lion Driveway-US 221	12,275	21,600	3,020	76.0%
US 221-Possum Hollow Road	15,350	27,450	3,840	78.8%
North of Possum Hollow Road	14,525	26,150	3,660	80.0%

<sup>1</sup> 14 percent of Average Annual Traffic

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**Figure 1-3. Existing and Forecast Traffic Volumes**

This Figure may be viewed by clicking the [List of Figures](#) .

New or improved roads in North Carolina are designed to serve, at a desirable level of service, the “design hourly volume” 20 to 25 years in the future. This volume is usually expressed as a percentage of the ADT. For existing US 321 in 2025, the peak hour volume is forecast to be 14 percent of the ADT. The 2025 design hour volumes for each US 321 link are shown in Figure 1-3 and range between 1,970 and 3,840 vehicles per hour depending on the link.

### 1.5.6 Level of Service

Level of service (LOS) is a qualitative measure that characterizes the operational conditions within a traffic stream and represents the perception of traffic service by motorists and passengers. The different levels of service characterize these conditions in terms of such factors as vehicle speed, travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Six levels are used to measure level of service. They range from the letter A to F. For roadways, LOS A indicates no congestion and LOS F represents more traffic demand than road capacity and extreme delays.

Table 1-2 provides a general description of various levels of service for roadways as given in the *2000 Highway Capacity Manual*, as well as descriptions for signalized and unsignalized intersections. Specific level of service definitions vary for two-lane highways, multi-lane highways, and intersections. In addition, the level of service for signalized and unsignalized intersections cannot be compared directly. In general, a poor level of service rating still can be considered acceptable for an unsignalized intersection. This is because the unsignalized intersection analysis is based upon the delay for minor street drivers as they await sufficient gaps in major street traffic. The signalized intersection analysis provides an overall average delay and level of service for the entire intersection.

**Table 1-2. Level of Service Criteria**

Level of Service	Traffic Flow on Roadways	Delay at Signalized Intersection	Delay at Two-Way Stop Intersection
A	Free flowing traffic with little or no delays.	<= 5 sec	<=5 sec
B	A stable flow with few congestion-related restrictions on operating speed.	5-15 sec	5-10 sec
C	Stable flow but with more restrictions on speed and changing lanes.	15-25 sec	10-20 sec
D	Approaches unstable conditions and passing becomes extremely difficult. Motorists are delayed an average of 75 percent of the time.	25-40 sec	20-30 sec
E	The capacity of a roadway. Passing is virtually impossible, speeds drop when slow vehicles or other interruptions are encountered.	40-60 sec	30-45 sec
F	Heavily congested flow with traffic demand exceeding the capacity of the highway.	>60 sec	>45 sec

New or upgraded roads in rural areas in North Carolina typically are designed for LOS C for the peak hour volume in the design year. This policy is based on pages 84 to 88 of *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 2000). For urban areas, LOS D is typically acceptable when it is too costly or environmentally damaging to design for a better level of service, but LOS C is preferred. The goal for the US 321 improvements is LOS C or better in 2025.

### 1998

Table 1-3 presents the design hour level of service for each roadway link. As shown, US 321 currently operates at LOS F south of Green Hill Road (and Blowing Rock). Since LOS F reflects traffic volumes greater than the capacity of the road, it indicates high delays and basically no passing opportunities exist during peak periods. A primary reason for this condition is the mountainous terrain, which results in slow truck speeds. Through Blowing Rock, the level of service is undesirable (LOS D/E) in all locations, except north of the signalized intersection of US 221, where it improves to LOS C. The better level of service (LOS B) north of Possum Hollow Road occurs because US 321 has four lanes north of that point.

Table 1-4 summarizes the level of service for each intersection. All signalized and unsignalized intersections currently operate at LOS C or better. However, a few of the side-street movements at the unsignalized intersections are experiencing long delays (LOS F) during peak periods.

### 2025

Table 1-3 also includes level of service for year 2025 forecast traffic. The road south of Blowing Rock would continue to operate at LOS F in the peak periods although delays would increase substantially. US 321 through Blowing Rock would operate at LOS E between Green Hill Road and US 321 Business. Between US 321 Business and Possum Hollow Road, US 321 would operate at LOS F. Traffic flow under these conditions would be extremely congested during the design hour.

**Table 1-3. Design Hour Roadway Level of Service**

Link Description	1998	2025
South of Green Hill Road	F	F
Green Hill Road-Goforth Road	D	E
Goforth Road-US 321 Business	D	E
US 321 Business-Sunset Drive	D	F
Sunset Drive-Food Lion Driveway	E	F
Food Lion Driveway-US 221	E	F
US 221-Possum Hollow Road	C	F
North of Possum Hollow Road	B	C

**Table 1-4. Design Hour Intersection Level of Service**

Intersection		1998	2025
US 321/Green Hill Road	(Unsignalized)	D	F*
	(Signalized)	-	F <sup>1</sup>
US 321/Goforth	(Unsignalized)	C	F
US 321/US 321 Business	(Unsignalized)	F	F* <sup>2</sup>
	(Signalized)	-	D
US 321/Food Lion	(Unsignalized)	F <sup>3</sup>	F* <sup>3</sup>
	(Signalized)	-	F <sup>1</sup>
US 321/Sunset Drive	(Signalized)	C	F*
US 321/US 221	(Signalized)	B	F*
US 321/Shoppes on the Parkway	(Signalized)	B	F*

Notes:

LOS F\* indicates level of service worse than F and V/C (volume/capacity ratio) greater than 1.2.

<sup>1</sup> US 321 through traffic would operate at LOS F.

<sup>2</sup> Signal may be warranted.

<sup>3</sup> Traffic signals on either side of this intersection create large gaps. This may result in better levels of service in reality than the levels of service analysis indicates.

The level of service at all existing signalized intersections on US 321 would deteriorate to a poor LOS F, as shown in Table 1-4. The level of service of the unsignalized intersections at Green Hill Road, US 321 Business, and the Food Lion entrance also would deteriorate to F. A planning level signal warrant analysis [using ADT and peak hour-based warrants and the Institute of Transportation Engineers' (Kell and Fullerton, 1982) *Manual of Traffic Signal Design, Second Edition*] indicates the need for traffic signals at these intersections by 2025, although not as a part of an initial improvement. Even with signals, however, traffic at two of the three intersections would continue to operate at LOS F.

### 1.5.7 Accidents/Safety

Accident data for the project area were assessed for the period between June 1, 1996 and April 30, 1999. Accident rates, categorized by fatal accidents, non-fatal injury accidents, property damage accidents, and total number of reported accidents, were compared to average rates for other roads with similar characteristics in North Carolina. Average crash rates for various roads in North Carolina are based on NCDOT data for the years 1996 through 1998.

The accident rates are summarized as accidents per 100 million vehicle-miles (160 million vehicle-kilometers) driven. For example, if a 10-mile (16-kilometer) section of road carries an average of 10,000 vehicles per day, in one year 36.5 million vehicle-miles (58.4 million vehicle-kilometers) of travel would occur on that 10-mile (16-kilometer) stretch of road (10 miles [16 kilometers] times 10,000 vehicles per day times 365 days per year). If five accidents occur on this 10-mile (16-kilometer) section of road in a three-year period, the accident rate is 4.6

accidents per 100 million vehicle-miles (7.3 accidents per 100 million vehicle-kilometers). The 4.6 accidents per 100 million vehicle-miles (7.3 accidents per 100 million vehicle-kilometers) assumes that over the three-year period 109.5 million vehicle-miles (175.2 million vehicle-kilometers) of travel occur (36.5 million times 3). The 4.6 is calculated by dividing 100 million vehicle-miles (160 million vehicle-kilometers) by 109.5 million vehicle-miles (175.2 million vehicle-kilometers) and multiplying the result by 5. If one were interested in the average number of accidents per year, one would divide 5 by 3 for an average of 1.7 accidents per year.

Table 1-5 shows the number of accidents along the studied section of US 321 from 1996 to 1999 and accident rates for the existing roadway compared with the average rates for similar US routes in North Carolina.

### ***Rural Section***

The rural portion of US 321 starts at SR 1500 (Blackberry Road) and ends at the Blowing Rock town limits, 0.2 mile (0.3 kilometer) south of the intersection with Green Hill Road. It has a total length of 1.8 miles (2.9 kilometers). As indicated in Table 1-5, the accident rate for the rural portion is comparable to the state average for a rural roadway with similar characteristics. The rural portion of US 321 has a non-fatal injury rate that is 23 percent lower than the state as a whole. The property damage only accident rate is 17 percent higher, resulting in a similar overall rate for US 321 with lower severity. There were no reported fatal accidents during the reported period along this portion of US 321.

**Table 1-5. Accident Rates<sup>1</sup>**

Accident Type	Number of Accidents on US 321 (1996 to 1999)	Accident Rate		
		Existing <sup>2</sup> US 321	NCDOT <sup>3</sup> Average for 2-Lanes Undivided	Percent Difference
Rural Section South - SR 1500 (Blackberry Road) to Blowing Rock Town Limits				
Fatal	0	0 <sup>4</sup>	2.60	N/A <sup>4</sup>
Non-Fatal	9	67.69	88.37	-23%
Property Damage Only	16	120.34	102.96	17%
Total	25	188.03	193.93	-3%
Urban Section - Town Limits (south) to Town Limits (north of Possum Hollow Road)				
Fatal	1	4.01 <sup>4</sup>	1.10	N/A <sup>4</sup>
Non-Fatal	37	148.32	120.35	23%
Property Damage Only	55	220.48	169.39	30%
Total	93	372.82	290.84	28%

<sup>1</sup> Rates based upon 100 million vehicle-mile (160 million vehicle-kilometer) exposure.

<sup>2</sup> NCDOT accident data 6/1/96 through 4/30/99.

<sup>3</sup> Average rates provided by NCDOT for rural and urban two-lane US routes for 1996-1998.

<sup>4</sup> Accident rate resulting from zero or one fatality and is not statistically significant.

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The majority of the accidents on the rural section were comprised of a few general types. Forty-eight percent of the accidents involved single vehicles running off the road. In addition, 24 percent of the accidents were the result of vehicles striking the rear of a slower or stopped vehicle, and 20 percent were angle accidents. The provision of extra lanes and standard shoulders could reduce these accidents substantially. Easing of the sharp curves could result in fewer vehicles running off the road and improve visibility to decrease rear-end accidents.

While weather plays a factor in some accidents, no specific trends were noted in the accident analysis. No data were available to measure the effect of fog on accidents in the project area.

### ***Urban Section***

The urban section of US 321 is a 2.3-mile (3.7-kilometer) route through the Town of Blowing Rock. It starts at the town limits, just south of Green Hill Road, and ends just north of Possum Hollow Road. The existing accident rates in the urban section are presented and compared with North Carolina averages in Table 1-5. The total accident rate for existing US 321 through Blowing Rock is 28 percent higher than for similar urban US routes in North Carolina. The non-fatal injury accident rate is 23 percent higher, and the property damage accident rate is 30 percent higher than the state comparative rate.

One fatality occurred during the three-year period. A high fatality rate resulted from only one fatality because of low exposure for the three-year accident study period. In other words, it takes more than three years for 100 million miles (160 million kilometers) of travel to occur on this segment of US 321. Since the fatal accident rate in this case is based on less than 100 million miles of travel, its statistical significance is compromised. The number of fatal accidents statewide is far lower than for non-fatal accidents (1.10 vs. 120.35). Thus, the differences between Blowing Rock's three-year record of one fatality and the statewide averages for the same period are not statistically significant. The high accident rate overall and the high rates for the other two more common types of accidents, however, are indicative of a road that is not as safe as it could be.

Accident records indicate that almost all intersections on this section of US 321 are prone to a high number of accidents. A majority of these accidents, 48 percent of the total, involved vehicles rear-ending slow or stopped vehicles. An additional 24 percent involved angle collisions. Between US 321 Business and US 221, accidents often were related to traffic entering/exiting driveways. No weather-related trends were observed in the urban section.

The analysis identified five high accident locations. Of the five locations identified, four were individual intersections. The roadway section identified as a high accident location includes a series of reverse curves (curve in one direction that is followed almost immediately by a curve in the opposite direction), as well as two closely spaced intersections with poor sight distance. The five locations are:

- Green Hill Road intersection – six total accidents, five injuries.
- US 321 between intersections with Pinnacle Avenue and Country Club Drive – ten total accidents, eight injuries, and one fatality.
- US 321 Business intersection – 18 total accidents, nine injuries.

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- Sunset Drive signalized intersection – 16 total accidents, two injuries.
  - Possum Hollow Road/Shoppes on the Parkway signalized intersection – 18 total accidents, 12 injuries.

## **1.6 Modal Interrelationships**

The project area is not served by rail. An airport is in Boone. There is no relationship between the proposed project and the airport in Boone.

## **1.7 Summary**

The proposed improvement is included in the county thoroughfare plans and the NCDOT's 2002- to 2008 Transportation Improvement Program. Without the proposed action, the forecast traffic along this section of US 321 will exceed the road's capacity by 2025, creating undesirable levels of service. Improvements are needed to provide improve mobility. In addition, without improvement, high accident rates are expected to continue. The number of accidents will likely rise as traffic volumes continue to rise. Improved sight distances can be created by straightening curves and by providing separate lanes for drivers turning left or by providing an additional through lane so through traffic has the opportunity to pass those turning.

This portion of US 321 is part of the North Carolina Intrastate System. The US 321 corridor is defined as the principal north-south route uniting the western Piedmont. The intrastate system plan calls for the widening of the system's existing two-lane roads to at least four travel lanes. The proposed project is necessary for system continuity and a reasonable expenditure of public funds even if no additional improvements are made.